

ABSTRACT

To provide a unit-layer post-treatment catalyst vapor-deposition apparatus and unit-layer post-treatment film forming method capable of improving in-face uniformity, step coverage, and film quality of a silicon nitride film or the like and forming a thin film by performing surface treatment after forming a film for each unit layer.

A thin film post-treated for each unit layer is laminated by using a film forming step of introducing mixed gas of silane gas and ammonia gas into a reactive vessel 2 as a source gas like a rectangular pulse and contacting with and thermal-decomposing the source gas by a catalyst body 8, and forming a silicon nitride film on a substrate 5, one surface treating step of bringing ammonia gas into contact with the catalyst body 8 and then bleaching the ammonia gas on the surface of a silicon nitride film on the substrate 5 and other surface treating step of bleaching hydrogen gas on the surface of the silicon nitride film on the substrate 5 after bringing hydrogen gas into contact with the catalyst body 8 as one cycle and repeating the step of one cycle.